[0020] In some embodiments, the adjustable voltage source can include a three-phase adjustable voltage source disposed to produce three output voltages whose magnitudes and phase angles can be adjusted, and the three-phase adjustable voltage source can be connected in series with two or more at least one windings of one or more induction machine phases such that adjusting the magnitudes and phase angles of the output voltages can cause changes in the phase angles of the currents flowing through the two or more at least one windings, and the magnitudes and phase angles of the output voltages can be adjusted until the phase angles of the currents flowing through the two or more at least one windings are such that the desired power factor is achieved.

[0021] In some embodiments, the three-phase adjustable voltage source includes an alternating current to direct current power electronic converter and a direct current energy storage device.

[0022] In some embodiments, the alternating current to direct current power electronic converter includes a floating three-phase inverter.

[0023] In some embodiments, the direct current energy storage device includes a capacitor, a super capacitor or an electro-chemical battery.

[0024] In some embodiments, the induction machine includes an induction motor or an induction generator.

[0025] Broadly stated, in some embodiments, an improved induction machine with a controllable power factor is provided, the improved induction machine including: at least one induction machine phase, each induction machine phase further including at least one winding; means for connecting the at least one winding of each induction machine phase to an external alternating voltage supply such that current can be supplied to the at least one winding of each at least one induction machine phase; at least one adjustable voltage source configured to produce at least one output voltage whose magnitude and phase angle can be adjusted; and means for connecting the at least one adjustable voltage source in series with the at least one winding of the at least one induction machine phase, wherein adjusting the magnitude and phase angle of the at least one output voltage changes the power factor.

[0026] In some embodiments, the improved induction machine can further include means for connecting the at least one winding of each at least one induction machine phase to one or more other at least one windings of one or more other induction machine phases as required to achieve the desired connection configuration between the induction machine phases.

[0027] In some embodiments, the adjustable voltage source can include an alternating current to direct current power electronic converter and a direct current energy storage device.

[0028] In some embodiments, the alternating current to direct current power electronic converter can include a floating H-bridge.

[0029] In some embodiments, the number of induction machine phases can be three.

[0030] In some embodiments, the desired connection configuration between the induction machine phases can include a wye or delta configuration.

[0031] In some embodiments, the adjustable voltage source can include a three-phase adjustable voltage source disposed to produce three output voltages whose magnitudes and phase angles can be adjusted, and the three-phase adjustable voltage source can be connected in series with two or more at least one windings of one or more induction machine phases such that adjusting the magnitudes and phase angles of the output voltages can cause changes in the phase angles of the currents flowing through the two or more at least one windings.

[0032] In some embodiments, the three-phase adjustable voltage source can include an alternating current to direct current power electronic converter and a direct current energy storage device.

[0033] In some embodiments, the alternating current to direct current power electronic converter can include a floating three-phase inverter.

[0034] In some embodiments, the direct current energy storage device can include a capacitor, a super capacitor or an electro-chemical battery.

[0035] In some embodiments, the improved induction machine can include an improved induction motor or an improved induction generator.

BRIEF DESCRIPTION OF THE DRAWINGS:

[0036] FIG. **1**A is a schematic diagram depicting an embodiment of a grid-connected induction machine with a controllable power factor.

[0037] FIG. **1**B is a phasor diagram depicting the difference in phase angles between the voltage and current flowing through the induction machine winding depicted in FIG. **1**A.

[0038] FIG. **1**C is a phasor diagram depicting how a voltage can be applied by the adjustable voltage source in FIG. **1**A to match the phase angle of the winding current to the phase angle of the grid AC source voltage.

[0039] FIG. **1**D is a phasor diagram depicting how a voltage can be applied by the adjustable voltage source in FIG. **1**A to create a leading phase angle between the grid AC source voltage and the winding current.

[0040] FIG. **2** is a schematic diagram depicting one embodiment of a floating H-bridge with an integral DC capacitor.

[0041] FIG. **3** is a schematic diagram depicting an embodiment of a grid-connected split-phase induction machine with a controllable power factor.

[0042] FIG. **4** is a schematic diagram depicting an embodiment of a wye-equivalent three-phase grid-connected induction machine with a controllable power factor.

[0043] FIG. **5** is a schematic diagram depicting an embodiment of a delta-equivalent three-phase grid-connected induction machine with a controllable power factor.

[0044] FIG. **6** is a schematic diagram depicting an embodiment of a floating three-phase inverter with an integral DC capacitor.

[0045] FIG. **7**A is a schematic diagram depicting an embodiment of a three-phase grid-connected induction machine connected in an open winding configuration.

[0046] FIG. **7**B is a schematic diagram depicting an embodiment of a three-phase grid-connected induction machine connected in a wye configuration.

[0047] FIG. **7**C is a schematic diagram depicting an embodiment of a three-phase grid-connected induction machine connected in a delta configuration.

[0048] FIG. **8**A is a schematic diagram depicting an embodiment of a nine-terminal three-phase grid-connected induction machine connected in a wye configuration.

[0049] FIG. **8**B is a schematic diagram depicting an embodiment of a nine-terminal three-phase grid-connected